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The dynamics of tsunami affected soil properties in Aceh, Indonesia

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Understanding the dynamics of tsunami-affected soil properties is a key for reconstructing the local agriculture after tsunami events. We conducted a series of soil research after the 26 December 2004 Indian Ocean tsunami in the coastal areas of Nanggroe Aceh Darussalam (NAD) Province, Indonesia. The objectives of the study were to evaluate (i) the extent and types of soil damages, (ii) soil profiles of the affected area, (iii) changes in soil properties over time, and (iv) crop response. Survey of the extent and severity of soil damages from January 2005 to the end of 2007. Four soil profiles were evaluated in May 2005 and August 2007 in Aceh Besar District. Changes in soil salinity were evaluated at several monitoring sites using the electric conductivity (EC) meter based on soil samples and in the field using an electromagnetic induction soil conductivity instrument (EM38) from mid 2005 to the end of 2007. The tsunami waves affected the coastal areas up to 5 km inland. The damages ranged from permanent inundation, tsunami mud/sand accumulation and surface crusting and salinity. Salinity level of up to 84 dS m^{-1} was measured a few weeks after the tsunami, but it decreased to <4 dS m^{-1} by October 2007 except in areas where lateral/vertical drainage is retarded. Soil pH, organic carbon content, exchangeable cations and total phosphorus were higher in the tsunami formed 'O' horizon than in the underlying layers. Yields of rice and dryland crops were lower in the first few seasons after the tsunami and empty pods of peanut and unfilled grain of rice were commonly observed. This could be attributed to either or combination of salinity, sodicity, cation imbalance and low micro nutrient availability. The tsunami effects were very variable and therefore management needs to be site-specific to be effective. In general, reconstruction of irrigation and drainage systems and application of organic matter speeded up the soil recovery.

"Na-no-hana Project" for recovery from the Tsunami disaster by producing salinity-tolerant oilseed rape lines

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Fields of more than 20,000 ha in Tohoku region have suffered the Tsunami disaster by the Higashinippon earthquake, and it may be difficult to grow crops in these fields for several years because of high salinity. *Brassica* crops, e.g., oilseed rape, cabbage, radish, and mustard, are known to have relatively high tolerance to salinity and to absorb much salt. However, most of the *Brassica* crops are outcrossing plants, and have high variation of salinity tolerance within a species. Since Tohoku University has unique genetic resources of *Brassica* crops and its wild relatives, we planned to use these genetic resources as materials for developing salinity-tolerant oilseed rape